

**SECRET**

2870 - mlh

**ABSTRACT**

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2 (S) Two embodiments of a multilayered low energy optical power limiter device are  
3 disclosed which protect thermal sensors against laser threats in the far infrared spectral  
4 region. One limiter device has multiple layers in order from the incoming radiation side  
5 an antireflective coating layer, a window substrate layer, a layer of chalcogenide, a  
6 germanium substrate layer, a layer of vanadium dioxide ( $\text{VO}_2$ ), a window substrate, and  
7 an antireflective coating layer. As incoming radiation energy increases, the  $\text{VO}_2$  layer  
8 will heat up and change from an unswitched transmissive state to a switched reflective  
9 state. The excessive energy past the switched state is reflected back through the  
10 germanium and chalcogenide layer and is absorbed quickly therein so that these layers  
11 also heat up quickly and are switched almost simultaneously with the  $\text{VO}_2$  layer to  
12 provide high optical density at a low switching threshold temperature with high damage  
13 threshold. The second embodiment further adds a second  $\text{VO}_2$  layer between the input  
14 antireflective coating layer and window substrate layers to reflect high radiation energy  
15 immediately.

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